



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460

AUG 9 2001

OFFICE OF  
SOLID WASTE AND EMERGENCY  
RESPONSE

Andy Lawrence, Director  
Office of Environmental Policy and Guidance  
Department of Energy  
Washington, DC 20585

Dear Mr. Lawrence:

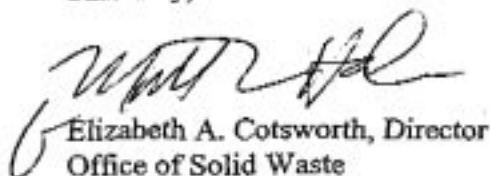
Thank you for your letter dated May 24, 2001 requesting clarification of the Land Disposal Restrictions (LDR) treatment standard for discarded radioactive contaminated lead acid batteries. As you know, the LDR treatment standard must be met before hazardous waste may be land disposed. There are three subcategories under the LDR treatment standard for lead: numerical treatment standards are required for general wastes exhibiting the lead toxicity characteristic (TC); lead recovery (i.e., smelting) is required for lead acid batteries; and macroencapsulation is required for radioactive lead shielding and other elemental forms of lead.

You explained that several Department of Energy facilities manage drained, lead acid batteries which are radioactively contaminated. These batteries display the TC for lead. You asked whether you should apply the LDR treatment standard that requires lead recovery, or the one that requires macroencapsulation of radioactive lead shielding and other forms of elemental lead.

We agree with you that the appropriate treatment standard is macroencapsulation. This treatment standard applies not only to lead shielding, but to other elemental forms of lead. Thus, there is latitude in the treatment standard to permit its application to radioactive lead acid batteries. We also believe that macroencapsulation is appropriate because it would require less worker handling than lead recovery, and we want to minimize worker exposure to radioactivity. Furthermore, lead recovery of these batteries would radioactively contaminate the entire mass of lead that was recovered, making it unusable.

I hope you find this information helpful. Do not hesitate to contact me if you have questions.

Sincerely,



Elizabeth A. Cotsworth, Director  
Office of Solid Waste



**Department of Energy**  
Washington, DC 20585  
May 24, 2001

Elizabeth A. Cotsworth, Director  
Office of Solid Waste (5301W)  
U.S. Environmental Protection Agency  
1200 Pennsylvania Avenue, N.W.  
Washington, D.C. 20460

Re: *Interpretation of LDR Treatment Standard Applicable to Drained, Radioactively Contaminated Lead Acid Batteries*

Dear Ms. Cotsworth:

The purpose of this letter is to request clarification concerning the treatment standard under the Resource Conservation and Recovery Act (RCRA) Land Disposal Restrictions (LDR) program that applies to drained, radioactively contaminated lead acid batteries.

Under the LDR program, a prohibited waste must meet the applicable treatment standard before it can be disposed. Such treatment standards are identified in 40 CFR 268.40 and are linked to prohibited wastes by way of a waste code and a "waste description and treatment/regulatory subcategory." For wastes that exhibit the Toxicity Characteristic (TC) for lead (D008 waste code), three subcategories are named: one applies in general to wastes exhibiting the TC for lead, and the other two apply to specific lead wastes (i.e., lead acid batteries and radioactive lead solids).

Several Department of Energy (DOE) facilities manage drained, lead acid batteries, which became radioactively contaminated during use. These drained batteries exhibit the TC for lead. However, it is unclear whether such radioactive D008 wastes should be assigned to the "Radioactive Lead Solids" or the "Lead Acid Batteries" subcategory. DOE believes these radioactive waste batteries should be assigned to the D008 "Radioactive Lead Solids" subcategory and, accordingly, should be subject to the LDR treatment standard of "MACRO."

Enclosed for your consideration is a paper supporting the above position. DOE would appreciate the Office of Solid Waste's review and response to this regulatory interpretation. If there are questions, or if you need additional information regarding this issue or the enclosed position paper, please contact Bill Fortune of my staff at (202) 586-7302.

Sincerely,

A handwritten signature in cursive script, appearing to read "Andy Lawrence", is written over a horizontal line.

Andy Lawrence  
Director  
Office of Environmental Policy & Guidance

Enclosure

cc: J. Berlow, EPA, Office of Solid Waste (5302W)  
H. Davis, EPA, Office of Solid Waste (5302W)

**U.S. Department of Energy  
Position Paper on  
Land Disposal Restrictions Treatment Standard Applicable to  
Certain Radioactively Contaminated Lead Acid Batteries**

**Statement of the Problem:** The Resource Conservation and Recovery Act (RCRA) Land Disposal Restrictions (LDR) treatment standards that apply to hazardous wastes exhibiting the Toxicity Characteristic (TC) for lead (D008) contain three subcategories: the generally applicable, TC lead waste subcategory; the D008 “Lead Acid Batteries” subcategory; and the D008 “Radioactive Lead Solids” subcategory. According to the waste descriptions associated with these subcategories, the LDR treatment standard for either the “Lead Acid Batteries” subcategory or the “Radioactive Lead Solids” subcategory could apply to drained, radioactively contaminated lead acid batteries.

**DOE’s Position on the Applicable LDR Treatment Standard:** For the reasons discussed in this paper, DOE believes that drained, radioactively contaminated lead acid batteries (i.e., radioactive waste batteries which cannot be readily decontaminated and are not amenable to thermal recovery processes) should be subject to the LDR treatment standard applicable to wastes in the D008 “Radioactive Lead Solids” subcategory.

**How DOE Sites Generate and Manage the Waste:** DOE handles radioactive materials at many of its facilities, which are located in several states. Some activities conducted in radiological areas involve equipment powered by lead acid batteries. As a result, such batteries are exposed to radioactive materials and may become contaminated. The options for managing batteries used in radiological areas (after their removal from service) become limited, unless a demonstration can be made that the batteries are not contaminated. If a potentially contaminated battery is intact and in good condition at the time it is removed from service, a demonstration can sometimes be made that the battery either is not radioactive, or has been successfully decontaminated (i.e., that the battery contains no measurable radioactivity). In such circumstances, the electrolyte solution is drained and managed as D002 (corrosive) hazardous waste. The drained, lead acid battery, which contains no measurable radioactivity but exhibits the toxicity characteristic for lead (D008), is managed separately to meet the LDR treatment standard applicable to the D008 “Lead Acid Batteries” subcategory. (This treatment standard is RLEAD, which is described on 40 CFR 268.42, Table 1 as “thermal recovery of lead in secondary lead smelters.”) However, if a demonstration cannot be made that the battery contains no measurable radioactivity,<sup>1</sup> treatment of the radioactive battery to meet the RLEAD treatment standard is precluded because no capacity currently exists for thermal recovery in secondary lead smelters of radioactively contaminated lead acid batteries,<sup>2</sup> which are mixed waste (radioactive/D008). For this reason, DOE sites listed on the following table have been storing contaminated lead acid batteries that contain measurable radioactivity and cannot be decontaminated.

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<sup>1</sup>A demonstration that a radioactively contaminated battery contains no measurable radioactivity may not be possible if the contamination consists of either fixed surface contamination or residual radioactive material that has become embedded in cracks, surface roughness, or other types of damages in the casing. For fixed surface contamination, this demonstration would not be possible if removal of the contamination to immeasurable levels is not practicable. For embedded contamination, this demonstration would not be possible if contaminated surfaces could not be accessed with a monitoring device capable of showing that contamination is at immeasurable levels.

<sup>2</sup>In October 2000, GTS-Duratek, Inc. successfully demonstrated a process at DOE’s Oak Ridge site for reusing potentially contaminated lead as a component in shielded storage containers for radioactive wastes. This internal DOE recycling project, which is being coordinated through the Department’s National Center of Excellence for Metals Recycling (managed by DOE’s Oak Ridge Operations Office), is consistent with the Department-wide Lead Reuse Policy issued by the Secretary of Energy on January 19, 2001. However, the project is not configured to accept radioactive lead acid batteries.

DOE Site	Amount of Radioactively Contaminated Lead Acid Batteries
Portsmouth, OH	approximately 9.5 cubic meters
Brookhaven, NY	0.9 cubic meters
Hanford, WA	a few drums at most
Savannah River, SC	approximately 1.2 cubic meters

In addition, DOE's West Valley Demonstration Project site (West Valley, NY), which is not currently storing radioactively contaminated lead acid batteries, projects future generation of approximately 0.14 cubic meters.

**Analysis and Conclusion:** DOE believes drained, radioactively contaminated lead acid batteries should be categorized in the D008 "Radioactive Lead Solids" subcategory. The LDR regulations contain a note clarifying that the D008 "Radioactive Lead Solids" subcategory includes, but is not limited to, "all forms of lead shielding and *other elemental forms of lead*" (40 CFR 268.40, Table of Treatment Standards for Hazardous Wastes) (emphasis added). Specifically excluded from this subcategory are "treatment residuals such as hydroxide sludges, other wastewater treatment residuals, or incinerator ashes that can undergo conventional pozzolanic stabilization," and "organo-lead materials that can be incinerated and stabilized as ash" (40 CFR 268.40, Table of Treatment Standards for Hazardous Wastes). Nothing in these regulatory provisions precludes drained, radioactively contaminated lead acid batteries from being categorized as D008 "Radioactive Lead Solids." Further, the component of the waste description that refers to "other elemental forms of lead" seems to appropriately encompass drained, radioactively contaminated lead acid batteries, which also do not fall under any of the exclusions.

EPA has previously recognized the principles behind DOE's position that the LDR treatment standard applicable to wastes in the D008 "Lead Acid Batteries" subcategory (i.e., RLEAD) should not be required for drained, radioactively contaminated lead acid batteries. In 1990, EPA promulgated the LDR treatment standard for the D008 "Radioactive Lead Solids" subcategory (55 FR 22520; June 1, 1990). This treatment standard consists of: "Macroencapsulation with surface coating materials such as polymeric organics (e.g., resins and plastics) or with a jacket of inert inorganic materials to substantially reduce surface exposure to potential leaching media" (i.e., MACRO) (40 CFR 268.40, Table of Treatment Standards for Hazardous Wastes, and 40 CFR 268.42, Table 1, Technology Codes and Description of Technology-Based Standards). Regarding the choice of MACRO as the LDR treatment standard for the D008 "Radioactive Lead Solids" subcategory, EPA had previously explained in the preamble to the proposed "Land Disposal Restrictions for Third Third Scheduled Wastes" that the Agency did not believe metal recovery (i.e., smelting) to be an available technology for radioactive solids. EPA noted therein that: "Any lead recovery would be radioactive, and thus unusable. If the radioactive lead was smelted along with normal lead, the entire mass recovered would be unusable" (54 FR 48439; November 22, 1989).

Accordingly, DOE has concluded that drained, radioactively contaminated lead acid batteries generated and stored at DOE sites should be treated to meet the LDR treatment standard applicable to D008 "Radioactive Lead Solids" (i.e., MACRO). DOE believes this conclusion is further supported by the provisions of 40 CFR 268.42(d), which states: "Radioactive hazardous mixed wastes are subject to the treatment standards in §268.40. Where treatment standards are specified for radioactive mixed wastes in the Table of Treatment Standards, those treatment standards will govern. Where there is no specific treatment standard for radioactive mixed waste, the treatment standard for the hazardous waste (as designated by EPA waste code) applies." Based on this regulatory provision, DOE infers that, since a treatment standard has been specified for radioactive lead solids in 40 CFR 268.40, Table of Treatment Standards, it is the standard that should govern drained, radioactively contaminated lead acid batteries, which are radioactive lead solids.